

**ANALYSIS OF TRANSPORTATION MANAGEMENT STRATEGIES  
FOR THE 2020 REGIONAL TRANSPORTATION PLAN**

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## **ABSTRACT**

The 2020 Regional Transportation Plan (RTP) is the first long-range plan to not only identify transportation management strategies but also to analyze alternative levels of strategy implementation. The development of the transportation management component was coordinated through the Transportation Control Measures (TCM) Development Task Force. Transportation management project proposals were analyzed with the regional travel model and off-network methods as part of the scenario testing for the Plan. The results indicated that a regional strategy to implement a comprehensive and coordinated transportation management program can significantly increase transit ridership, reduce auto use, increase ridesharing and lower regional VMT as compared to conditions without these management strategies.

A range of transportation management strategies were identified for inclusion in the RTP. Selection of eleven specific strategies was based on their applicability by the year 2020 and their contributions to achieving RTP goals and objectives. Transportation Demand Management (TDM), Transportation System Management (TSM) and Intelligent Transportation System (ITS) applications were analyzed in order to quantify their effectiveness and to finalize the package of strategies for inclusion in the RTP. Tripmaking, VMT and emission reductions were calculated for each of the eleven strategies in order to compare the impact with the cost of implementation.

This paper provides an overview of the strategy objectives and describes the methods used to calculate the performance impacts of each strategy. Costs associated with different levels of implementation were estimated and project requirements identified. The final package of eleven transportation management strategies, implementation efforts, funding requirements and the expected benefits of these strategies is also discussed. The eleven strategies resulting from this planning process make up the transportation management component of the 2020 RTP.

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## **INTRODUCTION**

This paper summarizes the development and analysis of strategies for the transportation management component of the 2020 Regional Transportation Plan (RTP) termed Destination 2020(1). Eleven strategies were selected for consideration by the RTP Committee for inclusion in the Plan. Alternative transportation management strategies were developed and coordinated through the TCM Development Task Force. Summaries of the individual strategies were prepared to describe the objective of each strategy, current levels of strategy application and funding in the region, and estimated costs associated with implementation. A range of options that illustrate different levels of strategy application and their related costs were identified.

The benefits resulting from the application of each strategy are highlighted in this paper. Reductions in volatile organic compound (VOC) emissions, tripmaking and vehicle miles of travel (VMT) were calculated for each strategy to reflect the traffic congestion and air quality benefits achieved from their implementation. Nitrogen oxide emissions (NOx) are not considered in this paper. Although Northeastern Illinois is classified as a severe ozone non-attainment area, and VOCs and NOx may contribute to the formation of ground level ozone, extensive technical analysis conducted as part of the Lake Michigan Ozone Study (LMOS) has

determined that NO<sub>x</sub> reductions will not contribute to attainment in the four state region that includes northeastern Illinois (2). Since the USEPA approved a NO<sub>x</sub> waiver for the region in January 1996, conformity determinations have focused on the analysis of VOC emissions and do not include analysis of NO<sub>x</sub> emissions.

The methodologies used to perform calculations and to quantify the benefits consisted of statistical and spreadsheet analyses, scenario based application of the FHWA Travel Demand Management (TDM) Model (3), use of the CATS Conformity Analysis models and results and application of Transportation Control Measures (TCM) and Congestion Mitigation and Air Quality (CMAQ) project level evaluation techniques(4). The methodologies used to analyze the various strategies are summarized in this paper.

The eleven transportation management strategies developed by the TCM Development Task Force for the 2020 RTP are:

- Traffic Signal Coordination
- Development of Enhanced Rideshare Services
- Expanded Vanpool Programs
- Improvements to the Pedestrian and Bike Environment
- Priority Parking for High Occupancy Vehicles (HOVs)
- Regional Network of Park n' Pool and Park n' Ride Facilities
- Priority HOV Ramp By-pass Lanes
- Bus Management Systems and Transit Schedule Adherence
- Integration of Advanced Traveler Information Systems and Advanced Transportation Management Systems
- Expansion of the I-Pass Electronic Toll Collection System
- Increased Use of Direct Parking and Transit Incentives

The selection of transportation management strategies was predicated on an analysis of transportation management project proposals that were submitted through the TCM planning process and the Destination 2020 Call for Proposals (5). The Transportation Control Measures (TCM) Task Force focused its attention on strategies which have the potential to most effectively assist the region in meeting the 2020 RTP goals and objectives.

## **SCREENING ANALYSIS OF TRANSPORTATION MANAGEMENT SCENARIOS**

The deficiency analysis conducted during Plan development indicated that VMT was forecasted to increase by 35 percent and congested VMT by 60 percent if additional projects, policies and strategies beyond those currently programmed are not implemented. This indicated that transportation management strategies could play a role in improving system performance. Two transportation management scenarios were developed for testing as part of the 2020 alternatives analysis.

One scenario focused on increasing variable auto travel costs. This scenario increased real auto costs by \$ .02 per mile in addition to inflation. Such an increase could reflect an increase in motor fuel tax of between \$ .30 and \$ .40 per gallon over the planning period. A second

scenario focused on increasing fixed auto costs and a package of demand management strategies which included some very aggressive strategies to increase auto occupancy and reduce demand for auto travel. The second scenario included the following components:

- Enhanced regional rideshare programs, higher level of employer participation and support for alternative modes, and cost based incentives of 50¢ to \$1 per trip to reflect economic and time based incentives. Taken together it was estimated that they would produce an increase in average vehicle occupancy from 1.12 to 1.18;
- Increased bicycle and pedestrian friendliness. The pedestrian environment factor (PEF) was selectively increased resulting in a higher level and share of bicycle and pedestrian tripmaking; and
- Increased auto fixed costs of 25¢ per trip. Such an increase could represent a \$255 registration fee for example and would make non-auto modes more attractive.

These scenarios were evaluated through separate runs of the full CATS regional model. The results of these scenario tests suggested that decreases in both VMT and congested VMT of between 3-6 percent and 1-4 percent respectively might be possible if such measures were enacted. The analysis indicated that a comprehensive and coordinated transportation management strategy could provide additional travel options and improve the effectiveness of the regional transportation system. Therefore a package of eleven strategies was selected as a comprehensive approach to transportation management in the region. A majority of these strategies were either being implemented in the region or were currently under study for implementation in northeastern Illinois.

## **SUMMARY OF STRATEGIES**

Table 1 provides a summary of the selected transportation management strategies. Strategy descriptions, the benefits achieved from their application and the estimated costs for implementation of each strategy are identified in this Table. The current expenditures and programmed funding commitments for each strategy is provided along with the funding requirements for full implementation of the proposed transportation management strategy.

The strategy descriptions provide an overview of the strategy objectives and a discussion of some assumptions used to calculate the performance impact and cost of the strategy. Planned applications up to the Year 2020 are outlined and the costs to implement various levels of the strategies estimated. These costs were projected to the year 2020 based on levels of support for current programs and the described level of implementation for the strategy. The following sections summarize the eleven strategies in the transportation management component of the 2020 RTP.

### **Traffic Signal Coordination**

An increase in the number of route miles that are signal interconnected on the region's roadway system was proposed as a transportation management strategy. About 30% of the region's 1,360 mile Strategic Regional Arterial (SRA) system is currently interconnected. An increase to the 50% level would add 199 centerline miles of signal interconnects to the system

currently in place or programmed. Signal coordination on other roadways in the city of Chicago and surrounding areas was also proposed as part of this strategy. These additional routes would be identified through planning at a local basis. Traffic signal coordination involves the installation of traffic signal controllers and detectors along a roadway in a defined area to allow for the orderly progression of traffic. The provision of orderly traffic flows between signalized intersections increases traffic speed by reducing start and stop traffic movements.

Signal interconnection presently is being accomplished along major arterials in northeastern Illinois. The March 1997 CATS Strategic Regional Arterial Study Status Report (6) estimated that approximately 296 miles of the 1,360 miles of SRAs identified in the 2010 Plan have had traffic signal interconnections installed. It is estimated that an additional eighty-nine (89) miles of traffic signal improvements are proposed in the SRA component of the 2020 RTP. Analysis of the 1997 CMAQ program and FY 96-00 TIP indicates that an additional 96 miles of SRA roadways (CMAQ: 76.70 miles and TIP: 18.85 miles) are currently programmed for signal interconnection and coordination. This strategy proposes to increase the miles of signal connect by 199 miles. The principal benefits include reduced traffic congestion; improved ability to accommodate increased traffic volumes and potential improvements in air quality due to increased traffic speeds. A collateral benefit is increased operating speeds for transit vehicles that use the SRA facility.

### **Development of Enhanced Rideshare Services**

An expanded marketing initiative and incentive program for the regional rideshare program is proposed as a transportation management strategy. Carpool and vanpool commuting would be promoted through employer-based marketing efforts and the development and application of strategies that remove barriers to ridesharing. Rideshare efforts will focus on employers and the general public to lessen reliance on single occupancy vehicles (SOVs) for work and other trips. Services will support employers in establishing firm-based programs, training employer staff, marketing carpool and vanpool commuting, providing carpool and vanpool matching functions, and offering public information and interagency coordination. Presently, CATS Rideshare Services and the Pace Vanpool Initiatives Program (VIP) publicly support carpool and/or vanpool formation within northeastern Illinois. An annual program budget of approximately \$674,000 has been allocated to perform outreach efforts (non-capital) and support rideshare development. Private sector involvement in the regional rideshare effort is provided by Van Pool Services Incorporated (VPSI). As targeted marketing and incentive programs are developed, the increased funding levels contemplated under this strategy will be needed and pursued. Peer regions, which experienced the growth in suburban development prior to northeastern Illinois and as such recognized the need to encourage carpool and vanpool formation, presently provide a higher level of support to achieve the benefits of traffic congestion reduction, air quality improvement and energy conservation.

### **Expanded Vanpool Programs**

An expansion of the regional vanpool programs to reach the full market potential for these services is proposed as a transportation management strategy. A combination of public sector programs such as the Pace VIP and private sector initiatives such as the capital cost of contracting option would be used to enhance vanpool services. Pace provides public

transportation in the suburban areas and currently operates approximately 250 VIP vehicles. Private contractors provide over 70 vans, and company sponsored programs provide additional vanpools.

This strategy aims to meet the expected increased demand for vanpools resulting from continued suburban development. The Access to Jobs and Training Programs is also expected to impact demand for vanpools. Coordination efforts between providers, social service agencies, and area employers are focusing on reducing barriers to employment by expanding transportation options such as vanpools. Additionally, the reverse commute market is expected to increase demand for vanpools. Suburban employment growth has increased city-to-suburb as well as suburb-to-suburb travel thereby promoting the attractiveness of vanpooling. Vanpools can provide convenient travel between the home and suburban workplace, particularly for trips exceeding 25 miles in length. Vanpools also can reduce the number of vehicles needed to make trips and provide an alternative to single occupant vehicle travel in lower density markets.

CATS market analysis study has estimated a regional potential for 2,000 vanpools. Under this transportation management strategy, the region would expand its vanpool programs to meet this expected demand.

### **Improvements to the Pedestrian and Bicycle Environment**

The upgrade and interconnection of existing sidewalks, pedways and bicycle facilities (paths, lanes, lockers and racks) and the construction of additional facilities to enhance pedestrian and bicycle modes as transportation options is proposed as a transportation management strategy. These linkages would improve non-motorized access to commercial, industrial, residential, and educational land uses as well as to transit facilities and services at targeted areas throughout the region. In addition, municipalities would promote pedestrian and bicycle modes, improve transit, and promote transit effectiveness by Transit Oriented Design (TOD) through the modification of existing ordinances and comprehensive plans or the adoption of new ordinances. Complimentary development around commuter rail and CTA stations would increase the number of activities accessible by non-motorized means and the use of bicycle and pedestrian modes.

### **Priority Parking for High Occupancy Vehicles**

The provision of priority parking locations for multi-occupant vehicles at some parking lots throughout the region is proposed as a transportation management strategy to support increased use of High Occupancy Vehicle (HOV) modes. The priority spaces would be located close to the building entrances to reduce the walk time for carpools and vanpool users. Reduced walk times yield a relative reduction of travel times for multi-occupant vehicle travelers. The reduced time benefit would impact all trip types and purposes. Communities would be encouraged to support provision of priority spaces at employment, commercial, retail, institutional, and other land uses which offer fee-based or free public use parking. The priority parking program can be implemented as local initiatives through ordinance, or through the voluntary efforts of employers and commercial site owners.

### **Regional Network Of Park n' Pool and Park n' Ride Facilities**

A regional network of park n' pool facilities that provides convenient meeting and assembly points for the formation of multi-occupant vehicle modes is proposed as a transportation management strategy. The objective of the park n' pool system is to reduce the collection and distribution times associated with vanpool and carpool use by limiting the number of dispersed pick-up and drop-off locations. An initial network of 20 park n' pool lots would be developed according to a phased implementation schedule. The park n' pool network would operate in conjunction with park n' ride lots in the region. A total network of 110 lots is proposed for construction by 2020 in Pace's Comprehensive Operating Plan (7). Park n' pool lots would be developed in moderate to high household suburban market areas and suburban corridors serving moderate to high employment concentrations. Specific sites would be selected based on criteria identified by planning agencies and implementors. These facilities initially would contain 50 parking spaces with the potential to expand to 100 spaces. The parking lots would contain limited amenities and provide parking for vanpool and carpool participants to support the formation of groups. The lots could accommodate fixed route transit services through initial and future connections. If transit is available in the area, these facilities also can be utilized for fixed route and express bus service. These facilities may either be newly constructed or developed as a joint ventures with existing or expanded parking facilities.

### **Priority HOV Ramp By-pass Lanes**

The provision of HOV by-pass lanes on regional expressway ramps with presently metered ramps is proposed as a transportation management strategy. Ramps with such by-pass lanes would allow HOV's to proceed into the main traffic flow in advance of single occupancy vehicles. Currently metered ramps could provide this capability. Metered ramps are normally in the principal flow direction. Carpools, vanpools and transit vehicles would be allowed to use the by-pass lane. Such priority lanes do not currently exist in northeastern Illinois. Priority lanes are present on the expressway system in Milwaukee, Wisconsin, Detroit, Michigan, and are widely used in California and other states. Milwaukee presently provides HOV by-pass lanes on 60 ramps and is anticipating an increase of 80% to 100% of its system. In addition to the VMT reductions associated with transit use and ridesharing, priority lanes reduce system delay for users without increasing delay for non-users. CATS is conducting a feasibility study to assess implementor options in suburban travel markets.

### **Bus Management Systems and Transit Schedule Adherence**

Bus management systems using communication, vehicle location, and control technologies to improve system performance are proposed as a transportation management strategy. Coupled with signal priority systems, the bus management system can improve schedule adherence and reliability. Both CTA and Pace are developing and installing advanced bus management systems. Pace's Transit Vehicle Management System (TVMS) is designed to use data communications and intelligent devices to link buses and bus drivers with garages, dispatchers, supervisors and other personnel. The CTA Bus Emergency Communications System (BECS) and Bus Service Management System (BSMS) will use these technologies to improve operations and service. These systems provide linkages between the transit operators, other agencies, and travelers. They improve service reliability and coordination by providing real-time information.



Bus management systems consist of electronic devices on-board the bus, which are linked by a vehicle communications network typically with these major components:

- Vehicle area network including data depository and processing and vehicle-network communications using GPS for automatic vehicle location information.
- Radio frequency data network
- Communications control center and management database
- Garage hardware and software including computer aided dispatching
- Traveler information systems.

Signal priority provides preferential movement of transit vehicles through signalized intersections. On-time performance is enhanced through the use of signal priority. Information on route schedule adherence is transmitted to the signal controller. In the TVMS, the green cycle of a traffic signal can be prolonged or the end of the opposing green signal initiated to allow the vehicle to proceed through an intersection. All communication between the vehicle and signal is automatic. The transit vehicle triggers signal preemption only if the bus is behind schedule; buses running on time would not affect the signal cycle.

### **Integration of Advanced Traveler Information System and Advanced Transportation Management Systems**

Advanced Traveler Information Systems (ATIS) and Advanced Transportation Management Systems (ATMS) are proposed as a transportation management strategy. Such systems would be developed, installed and operated to provide real time, multi-modal information to assist the traveler in making mode, route, and time of day decisions regarding trip-making. Both pre-trip and en-route information would be provided. ATIS/ATMS consists of four functions: data collection, information processing, distribution and system control. Data collection would utilize advanced traffic management systems and transit management systems to provide real-time data on conditions. Information distribution would use existing and new technologies. In-route information would be delivered by commercial traffic radio, variable message signs, highway advisory radio, information kiosks, personal digital assistants, active pager systems, active transit stops, in-vehicle systems, subscription traffic services, and other technologies. Pre-trip information would be delivered by traveler information centers, internet/intranet, interactive television, cable television, personal digital assistants, kiosks, subscription traffic services, and other technologies. Generally the public sector would collect and process the data and distribute information through selected media. Private sector partnerships would provide most of the information distribution. Development and application of ATMS/ATIS would be integrated through the Gary-Chicago-Milwaukee (GCM) ITS priority corridor program.

### **Expansion of the I-Pass Electronic Toll Collection System**

The I-Pass system utilizes in-vehicle transponders and fixed readers to perform the toll collection function. With this system, tolls can be assessed to vehicles equipped with the transponders without requiring a cash transaction or a stop at the toll plaza. The Illinois State Toll Highway Authority (ISTHA) has installed several I-Pass only lanes which permit the user to drive through the toll lane at 15 mph. The I-Pass technology also permits full speed reading of

the toll tag. The Tollway has investigated installation of full speed (55 mph) I-Pass express lanes at some plazas to reduce delays and improve operations. It is proposed that the use of electronic toll collection continue to be expanded. Phased implementation should continue from systemwide I-Pass toll lanes and advance to full speed I-Pass express lanes. These steps and extensive use of I-Pass transponders would eliminate the need for stops at toll plazas for many regular Tollway users. Delays at the plazas would be reduced. HOV users would be encouraged to use the I-Pass only system. In addition, the direct connection between the I-Pass only lanes and any nearby HOV facilities would be encouraged.

### **Increased Use of Direct Parking and Transit Incentives**

The provision of financial incentives to commuters using transit and multi-occupant vehicle modes for their trip to/from work is proposed as a transportation management strategy. Under this strategy, the commuter and the employer could have the following four options: expanded transit checks, an employer tax credit for promoting ridesharing, a transit commuter tax deduction, and cash-out parking. Such incentives would encourage use of transit and multi-occupant vehicles in the short-term and would result in lower parking space requirements at work locations over the long-term.

## **STRATEGY OPTIONS**

The implementation of transportation management strategies should be a coordinated effort between the public and private sectors. While specific levels of implementation have been identified and analyzed, various options for implementation can be pursued. The application of strategies will depend on regional transportation funding allocations and private sector initiatives.

Table 2 illustrates the range of implementation possible for each strategy and the resources and other commitments necessary to pursue each option. The advantages and disadvantages to the specific level of implementation are also identified in general terms. This range runs from continuing the existing level of effort, to voluntary programs on a localized level, to regional programs. It is anticipated that these strategies, when implemented in “packages”, will provide for even greater benefits than those estimated for the individual strategies.

## **STRATEGY BENEFITS**

The benefits that might be achieved through the implementation of the selected transportation management strategies are summarized in Table 3. Estimated benefits associated with each strategy includes reduction in VOC emissions in tons per day, number of vehicular trips eliminated per day, and reductions in VMT per day. In most cases, the strategy offers benefits in each of these areas. The benefits shown in Table 3 generally relate to the highest level option for implementation of the strategy.

To facilitate comparison of the implementation options for each strategy the costs and benefits associated with each option were estimated where possible. These estimates were driven by the cost and benefit results and the methods and assumptions. Both the costs and

benefits of the strategy options increase as more rigorous options are considered. In most cases the results are proportional or close to proportional. These costs and benefits by option are summarized in Table 4.

The assumptions and methodologies used to calculate the benefits are outlined in detail for each strategy in CATS' technical report "Analysis of Potential Transportation Management Strategies for the 2020 RTP" (8). The following summary provides brief descriptions of the methodologies used to calculate the benefits achievable from each strategy.

CMAQ project evaluation methodologies, as described in CATS Working Paper 96-13 (4), provided the basis for the calculated benefits for the following transportation management strategies:

- *Expanded Vanpool Program,*
- *Improvements to the Pedestrian and Bike Environment,*
- *Traffic Signal Coordination* (average benefit per mile)
- The *Regional Network of Park n' Pool and Park n' Ride Facilities* strategy benefits were based on a spreadsheet that utilized a modified CMAQ method. Two versions of the spreadsheet were prepared: one for the analysis of "park n' pool" lots (for carpool and vanpool) and one for the analysis of "park n' ride" lots (for both transit and vanpool).

Data contained in the U.S. DOT document "Intelligent Transportation Infrastructure Benefits: Expected and Experienced", January 1996 (9) was used as a primary resource for the following strategies:

- *Bus Management Systems and Transit Schedule Adherence,* Based on a summary of the benefits reported by 24 transit systems operating more than 10,000 vehicles under Automated Vehicle Location (AVL) supervision. Travel time, on-time performance, incident response time and return on investment data were provided.
- *Integration of Advanced Traveler Information Systems and Advanced Transportation Management Systems* Based on nationally reported system data such as travel time, travel speed, vehicle stops, delay, fuel consumption, and emission benefits.
- *Expansion of the I-Pass Electronic Toll Collection System* and information on national experiences with electronic toll collection systems, and also involving CMAQ methodology.

The FHWA Transportation Demand Management Model was applied to calculate the expected benefits for the following transportation management strategies:

- *Development of Enhanced Rideshare Services*
- *Priority Parking for High Occupancy Vehicles (HOV)*
- *Priority HOV Ramp By-pass Lanes*
- *Increased Use of Direct Parking and Transit Incentives*

The FHWA TDM Model was used to calculate mode share, vehicle occupancy, person trip, and VMT by using CATS regional trip table inputs. Spreadsheet calculations similar to the CMAQ methods were used to estimate the tons of hydrocarbons saved per day, trips eliminated per day, and VMT reduced per day. A calibration was run on the model to replicate existing conditions in the Chicago metropolitan area.

The FHWA Model was applied separately to the geographically defined markets served by CTA, Metra, and Pace to evaluate the parking and transit incentives. The existing average employer subsidy levels and participation rates in the transit check program were used to represent base conditions. Marketing and promotional (and possibly tax incentive) strategies to increase the voluntary participation rates were assumed. Spreadsheet calculations similar to the CMAQ method were used to estimate the tons of hydrocarbons saved per day, trips eliminated per day, and VMT reduced per day. A calibration was run on the model to replicate existing conditions in the Chicago metropolitan area.

## **SUMMARY**

Eleven strategies were presented for consideration in the 2020 Regional Transportation Plan. The cost and benefit analyses indicated that various levels of strategies can be useful in achieving the Plan goals and obtaining the most out of the available limited resources. The RTP Committee selected the mix of strategies for inclusion in the 2020 RTP and for potential application in the region. These strategies have the potential to contribute to a reduction in vehicle travel, improve system efficiency, improve traffic flow and increase transit ridership.

The transportation management strategies summarized in this working paper represent a partial list of the strategies currently being employed to greater or lesser degrees in the region and strategies to be considered for implementation. They and other strategies are designed to improve the performance of the existing transportation system through system enhancements or by influencing demand patterns. The analysis conducted as part of the 2020 planning process indicates that transportation management strategies would be most effective in accomplishing the Plan's objectives when they are implemented in a coordinated and comprehensive manner. The transportation management component of the 2020 Plan is intended as just such a coordinated and comprehensive implementation of transportation management strategies in the region.

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**Table 1: Summary of Transportation Management Strategies and Resource Needs**

Strategy	Description	Benefit	Estimated Cost	Expended to Date	Currently Programmed	Proposed In Plan	Proposed Increase
1. Traffic Signal Coordination	Increase from 22 % to 50 % route miles on the SRA system that are signal interconnected	Increase Vehicle Operating Speeds by 2.7 to 6.8 MPH on the SRA network	\$187 M Capital (1)	\$79.3M 296 miles 22% of sys. (2)	\$30.6M +96 miles 29% of sys	\$23.9M +89 miles 35% of sys (3)	\$53.3M +199 miles 50% of sys
2. Rideshare Development	Increase present per employee expenditure rate from \$0.22 to \$1.00 to support voluntary travel reduction thru CATS & Pace technical assistance/ promotion	Higher AVO	\$3M Annually 96\$ at \$1.00 per employee(4)	\$674K/yr	\$874K/yr	\$0	\$2.1M (\$1.00 per employee) per yr
3. Expanded Vanpool Program	Increase support level from 320 vans to 2,000 vans by using Pace & private provider	Higher AVO	\$120.4M Capital(5)	\$5.3M to FY96 320 vans (6)	\$5.3 M FY97-00 396 vans	\$29.7M to maint. Fleet at 396 vans (7)	\$80.1M fleet increase to 2K by Yr 2020
4. Improved Pedestrian & Bike Environmnt	Increase annual spending by 25% from \$8.9M to \$11.1M for bike, pedestrian related projects	Reduce VMT Increase Non-Motorized Trips		\$8.7M/year (8)	\$8.9M/year (9)	\$8.9M/year(10)	\$2.2M/year increase(11)
5 Priority HOV Parking	A regional policy to reserve close in parking spaces for HOV parking-all counties & trip types	Higher AVO	\$12.5 M Capital	Privately funded	\$0	\$0	\$12.5M for regional prog.
6. Reg. Network Park n' Pool Park n' Ride Lots (12)	Locate and construct 20 Locate and construct 110 (Pace)	Higher AVO Reduce SOV Commuting Increase Transit Share	\$4.8M \$110M in 96\$ (13)	\$0 \$2.2M FY94-96	\$180K \$2.6M FY97-00	\$0 \$10M (14)	\$4.6M \$95.2M for 95 lots
7. Priority HOV Ramp By-pass Lanes	Add HOV by-pass lanes at up to 94 presently metered ramps	Higher AVO	\$17.4M Capital	\$5.6M for 112 metered ramps (15)	\$0	\$0	\$11.8M for 94 metered ramps

Notes : 1 Total cost estimated using regional weighted avg. cost of \$268K/mi from current program

2 Obtained from CATS In-house Strategic Regional Arterial Studies Status, March 21, 1997

3 Signal interconnect for 19 miles of the 108 miles SRA add lanes included in current program

4 Sum of currently programmed projects and proposed increase

5 Net capital cost of new plus replacement vehicles cost less scrappage value

6 Current replacement cost

7 Equals \$39.6M purchase value minus \$9.9M scrappage value

8 Expenditures from STP, CMAQ and ITE programs for 93-96, 92-97, and 93-95, respectively, total \$32.5M or \$8.7M annual average

9 Total awards from STP, CMAQ and ITE were \$61.5M less \$32.5M expended leaving \$29.0M (or 8.7M annual average) plus \$0.2M for bike/ped. portion of IDOT projects from 1996-2000 TIP (estimated at 1% of total project costs for joint projects)

**Table 1: Summary of Transportation Management Strategies and Resource Needs (cont'd.)**

Strategy	Description	Benefit	Estimated Cost	Expended to Date	Currently Programmed	Proposed In Plan	Proposed Increase
8. Bus Management System and Schedule Adherence	Complete the installation of bus management systems on CTA & Pace including traffic signal priority to achieve bus schedules	Increase Transit Share	\$116M (tot) \$80M CTA \$36.3M Pace	\$30.0M  \$310K	\$30.0M CTA \$31.0M Pace 5 yr program (16)	TBD	\$20.0M \$5.0M
9. Advanced Traveler Information Systems and Advanced Transportation Management Systems	Complete installation of ATIS/ATMS under GCM Program and collect and process travel information to provide real time multi modal information to assist travelers in trip planning using existing & new technologies	Reduce Travel Time	\$38.8M for Initial Capital From Dedicated ITS Funds	\$8.9M GCM Corridor	\$10.5M	TBD	\$19.4M for total installation
10. Expand I-Pass System	Complete I-Pass systemwide and I-Pass Express lanes at most plazas and encourage HOV use	Reduce Delay at Toll Plazas, Improve Operations & HOV time savings	\$600 M to Install I-Pass Express in 2020 RehabNeeds	\$18.0M	\$40.0M for I-Pass systemwide	\$542.0M for I-Pass Express	
11. Direct Parking & Transit Incentives	Develop a program of individual and business incentives to encourage carpool, vanpool and transit commuting (17)	Reduce Single Occupancy Vehicle Commuting		\$7.3M/Yr <sub>(18)</sub> \$250K/Yr (RTA expense)	\$7.3M/Yr <sub>(19)</sub> \$250K/Yr (RTA expense)		19.2M/Yr <sub>(20)</sub> (21)

Notes : 10 Estimated non-motorized resources in plan assumes continued ped/bike share of CMAQ, ITE

11 Based on 25% increase over average annual \$8.9M expended

12 Park n' Ride lots would be jointly used for bus and vanpool services

13 Pace COP allocated \$267M for these lots. FY94-97 program includes 6 lots at avg cost of \$1M

14 Assumes 10 park n ride lots in plan

15 Based on metering cost of \$50,000 per ramp

16 Pace program is currently being reviewed as of June 1997

17 Focus on enhanced transit check program

18 Current participation rate for transit check program

19 Assumes continued participation rate in program

20 Based on potential increase of transit commuter tax deduction to \$170/month

21 Increase in RTA administrative budget will be proposed according to increased participation in the program



**Table 2: Transportation Management Strategy Options**

Strategy	Options	Requirements	Advantages	Disadvantages
1. Traffic Signal Coordination	A. Case by Case (29+%)	Phase I Analysis	More Fiscally Constrained	Lower Level of Service
	B. 89 Add'l Miles (35%)	Plan Commitment	Enhances Add Capacity Projects	Only Addresses Add Lanes
	C. 199 add'l Miles (50%)	Higher Funding Commitment	Meets More Deficient Locations	May Limit Ability to Meet Other Needs
2. Rideshare Development	A. Existing	Continue Existing Funding Levels		Minimum Service Level
	B. Incremental UWP	UWP Increase	Allows Increased Services	Limits Outreach
	C. To \$.50/empl Level	Additional Funding Sources	Supports Voluntary Programs	
	D. To \$1/empl Level	Additional Funding Sources	Meets Most Needs	May Limit Ability to Meet Other Needs
3. Expanded Vanpool	A. Meet Existing Demand (up to 396 Vans)	Continue Existing Funding Levels	Incremental Approach	Constrains Program Viability
	B. To 1,000 Level	Public/Private Partnerships	Increases Market Share	May Not Meet Demand
	C. To 2,000 Level	Higher Funding Level	Meets Projected Demand	May Limit Ability to Meet Other Needs
4. Improved Ped. And Bike	A. Existing Programs from CMAQ, Enhance	Maintain Current Levels	Begins Non-Motor. System	Provides Spot Improvements
	B. 10% Funding Increase	Coordinated Plan	Accelerates System Development	Some Barriers Remain
	C. 25% Funding Increase	Better Integration with Land Use	Provides Expanded Basic System	May Not Meet All Needs
5. Priority HOV Parking	A. Company Based	Voluntary Program	Increased Promotion	Limited Effectiveness
	B. Local Initiatives	Local Ordinance	Fosters Community Participation	Spotty Application
	C. Regional Program	State Enabling Legislation	Uniform Program	Mandatory Approach
6. Regional Park and Pool (excludes Park&Ride)	A. Meet Existing Demand	Identify Locations	Supports Carpool/ Vanpool	Limited Effectiveness
	B. 10 New lots	Program Sponsor	Expands Market	Unmet Demand
	C. 20 New Lots	Increased Funding Commitment	Establishes Program Visibility	May Limit Ability to Meet Other Needs
7. Priority HOV Ramp By-pass	A. Systemwide Feasibility Study	UWP Project	Evaluates Regional Applicability	No Projects Implemented
	B. Target Locations	Engineering Study	Operational Test of Concept	No Systemwide Effect
	C. Where Warranted	Design Policy	Target Congested Areas	Limited Effectiveness
	D. All Metered Ramps	Increased Funding Commitment	Maximum Benefit to HOV Users	Physical Constraints May Limit Locations

**Table 2: Transportation Management Strategy Options (cont'd.)**

Strategy	Options	Requirements	Advantages	Disadvantages
8. Bus Management System	A. Basic Functionality for Oper. Only	Ltd to Veh. Location and Communication	Enhances Bus Operations	Limited User Services
	B. Full Functionality for Oper. And User	Adds User Services incl. Bus Priority	Maximum Transit Efficiency, Security	Higher Capital, O&M Costs
9. Advanced Traveler Information (ATIS)	A. Upgrade TSC	Expand Computer/ Surveillance Systems	Current Highway Info.	No Comparable Info.
	B. Upgrade RTA Traveler Info. Center	Expand Computer/ Itinerary Systems	Current Transit Info.	No Comparable Info.
	C. Multi-modal Traveler Information system	Full Regional Architecture	Real Time Info. for All Modes	May Limit Ability to Meet Other Needs
10. Expanded I-Pass	A. I-Pass Systemwide	Reader Installations	Some Service Improvement	I-Pass Traffic Still Delayed
	B. I-Pass Only Lanes Most Plazas	Plaza Retrofits	Significantly Improved Service	Achieves Only Partial Advantage
	C. I-Pass Express Most Plazas	Major Plaza Redesign	Reduced Delay Allows HOV+ Priority	Creates Mixed Traffic Flows
	D. Electronic Tolling	Transponder Vehicles	Minimum Delay Allows HOV+ Priority	May Limit Ability to Meet Other Needs
11. Incentives	A. Expanded Transit Check	Increased Marketing	Increases Program Usage	Limited Effectiveness
	B. Employer Tax Credit for Transit	Federal or State Legislation	Supports Voluntary Employer Programs	Impact Limited to Work Trips
	C. Transit Commuter Deduction Tax	Federal or State Legislation	Supports Individual Decisions for Transit	May Reduce Tax Revenues
	D. Cash-Out Parking	Federal or State Legislation	Shifts Suburban Market to Alt. Modes	Substantial Cash Transfers Required

**Table 3: Transportation Management Strategy Benefits**

Strategy	Description	Benefit	Method <sup>(1)</sup>	Reduced VOC(tpd)	Daily Trips Reduced	Daily VMT Reduced
1. Traffic Signal Coordination	Increase from 22 % to 50 % route miles on the SRA system that are signal interconnected	Increase Vehicle Operating Speeds by 2.7 to 6.8 MPH on the SRA network	CMAQ	1.68	NA	NA
2. Rideshare Development	Increase the present per employee expenditure rate from \$.22 to \$1.00 to support voluntary travel reduction thru technical assistance and promotion by CATS & Pace	Higher AVO	TDM Model based (work trips)	0.54 to 0.62 <sup>(2)</sup>	14,600 to 16,200	496,300 to 564,300
3. Expanded Vanpool Program	Increase support level from 320 vans to 2,000 vans by using Pace & private provider	Higher AVO	CMAQ	0.85	11,000	770,100
4. Improved Pedestrian & Bike Environment	Increase annual spending by 25% from \$8.9M to \$11.1M for bike, pedestrian and related projects	Reduce VMT Increase Non Motorized Trips	CMAQ	0.013	12,096	12,746
5. Priority HOV Parking	Local and voluntary efforts to provide HOV priority parking	Higher AVO	TDM Model based	0.07 to 0.67 <sup>(3)</sup>	1,595 to 14,353	68,100 to 612,175
6. Reg. Network Park n' Pool Park n' Ride Lots	Locate and construct 19 (for a total of 20) lots	Higher AVO	CMAQ	0.02	660	14,075
	Locate and construct 110 (Pace)		CMAQ	0.19	7,920	179,725
7. Priority HOV Ramp By-pass Lanes	Add HOV by-pass lanes from 30 to 94 presently and newly metered ramps in suburban corridors <sup>(5)</sup>	Higher AVO	TDM Model based	0.30 to 0.94 <sup>(4)</sup>	4,260 to 13,348	326,500 to 1,023,000

**Table 3: Transportation Management Strategy Benefits (cont'd.)**

Strategy	Description	Benefit	Method <sub>(1)</sub>	Reduced VOC(tpd)	Daily Trips Reduced	Daily VMT Reduced
8. Bus Management System and Schedule Adherence	Complete the installation of bus management systems on CTA & Pace including traffic signal priority to achieve bus schedules	Increase Transit Share Travel time 15-18% decr. On-time 12-23% incr. Incidence response decr Up to 45% Return on invest	ITS Evaluation			
9. Advanced Traveler Information Systems and Advanced Transportation Management Systems	Complete installation of ATIS/ ATMS under GCM Program and collect and process travel information to provide real time multi modal information to assist travelers in trip planning using existing & new technologies	For combined program Reduce Travel Time Travel time 8-48% decr Travel spd 14-22% incr Fuel use 6-12% decr. VOC 4-25% decr. Fatalities 10% decr. Delay 17-37% decr.	ITS Evaluation			
10. Expand I-Pass System	Complete I-Pass systemwide and I-Pass Express lanes at most plazas and encourage HOV use	Reduce Delay at Toll Plazas, Improve Operations & HOV time savings	ITS Evaluation	1.63	NA	NA
11. Direct Parking & Transit Incentives	Expanded marketing and promotion of Transit Check in three identifiable markets	Reduce Single Occupancy Vehicle Commuting	TDM Model based CTA Market Metra Market Pace Market	0.15 0.02 0.44 total 0.61 <sub>(6)</sub>	1,380 11,700 <sub>(7)</sub>	141,200 17,932 396,800

1. Calculation method used to estimate benefits. The benefits are based on implementation of the full strategy unless otherwise noted.

2. Rideshare benefits are calculated based on incremental strategy.

3. Priority parking benefits are calculated based on local and voluntary priority program and support.

4. Ramp by-pass benefits calculated on suburban corridor where potentially feasible.

5. Program is based on priority ramps at approximately one-third of 94 feasible ramps.

6. Incentive benefits are calculated based on a voluntary transit check based program in three markets.

7. Combining transit and rideshare incentives in Metra's market diverts and estimated 3,000 trips.

**Table 4: Costs and Benefits for Strategy Options**

<b>Strategy</b>	<b>Options</b>	<b>Cost <sup>(1)</sup></b>	<b>Benefits <sup>(1)</sup></b>
1. Traffic Signal Coordination	A. Case by Case (29+%)	\$30.6 M	0.97 tons/day VOC reduced
	B. 89 Add'l Miles (35%)	\$23.9 M increase (\$54.5 M total)	1.18 tons/day VOC reduced
	C. 199 Add'l Miles (50%)	\$53.3 M increase (\$83.9 M total)	1.68 tons/day VOC reduced
2. Rideshare Development	A. Existing	\$674 K per yr	0.41-0.48 tons/day VOC reduced
	B. Incremental UWP (2)	\$200 K per yr increase (\$874 K per yr)	0.54-0.62 tons/day VOC reduced
	C. To \$.50/empl Level	\$626 K per yr	0.92-1.06 tons/day VOC reduced
	D. To \$1/empl Level	\$2.1 M per yr increase (\$3.0 M total)	1.83-2.1 tons/day VOC reduced
3. Expanded Vanpool	A. Meet Existing Demand (up to 396 Vans)	\$5.3 M	0.17 tons/day VOC reduced
	B. To 1,000 Level	\$20.0 M increase (\$25.3 M total)	0.43 tons/day VOC reduced
	C. To 2,000 Level	\$80.1 M increase (\$85.4 M total)	0.85 tons/day VOC reduced
4. Improved Ped. and Bike	A. Existing Programs from CMAQ, Enhance	\$8.9 M per yr	0.04 tons/day VOC reduced
	B. 10% Funding Increase	\$0.89 M increase) (\$9.79 M per yr)	0.044 tons/day VOC reduced
	C. 25% Funding Increase	\$2.2 M increase (\$11.1 M per yr)	0.05 tons/day VOC reduced
5. Priority HOV Parking	A. Company Based (Suburban)	\$1.58 M total	0.07 tons/day VOC reduced
	B. Local Initiatives (Suburban)	\$1.82 M total	0.11 tons/day VOC reduced
	C. Regional Program	\$12.5 M total	0.67 tons/day VOC reduced
6.(a) Regional Park 'n' Pool	A. Meet Existing Demand (1 lot)	\$240 K total	0.0008 tons/day VOC reduced
	B. 10 New lots	\$2.4 M increase (\$2.6 M total)	0.008 tons/day VOC reduced
	C. 19 New Lots	\$4.6 M increase (\$4.8 M total)	0.02 tons/day VOC reduced
6.(b) Regional Park 'n' Ride	A. Meet Existing Demand (1 lot)	\$1 M per lot	0.002 tons/day VOC reduced
	B. 55 New lots	\$55 M	0.10 tons/day VOC reduced
	C. 110 New Lots	\$110 M total	0.19 tons/day VOC reduced

**Table 4: Costs and Benefits for Strategy Options (cont'd.)**

Strategy	Options	Cost	Benefits (1)
7. Priority HOV Ramp By-pass	A. Systemwide Feasibility Study		
	B. Target Locations (30 Ramps)	\$3.8 M total	0.30 tons/day VOC reduced
	C. Where Warranted (60 Ramps)	\$7.5 M total	0.60 tons/day VOC reduced
	D. All Metered Ramps (94 Ramps)	\$11.8 M total	0.94 tons/day VOC reduced
8. Bus Management System	A. Basic Functionality for Oper. Only		
	B. Full Functionality for Oper. and User		
9. Advanced Traveler Information	A. Upgrade TSC		
	B. Upgrade RTA Traveler Info. Center		
	C. Multi-modal Traveler Information system		
10. Expanded I-Pass	A. I-Pass Only Systemwide	\$58.0 M	
	B. I-Pass Express Selected Plazas	\$48.0 M	0.40 tons/day VOC reduced
	C. I-Pass Express Most Plazas	\$494 M increase (\$542 M total)	1.63 tons/day VOC reduced
	D. Electronic Tolling		
11. Incentives	A. Expanded Transit Check	\$250K per yr (RTA) \$7.3 M per yr (private sector)	0.61 tons/day VOC reduced
	B. Employer Tax Credit for Transit	To be determined	To be determined
	C. Transit Commuter Tax Deduction	To be determined	To be determined
	D. Cash-out Parking	To be determined	To be determined

Notes: (1) Costs are expressed in either annual or total plan period (1997-2020) costs.  
(2) Based on incremental UWP strategy to increase funding \$200 K/yr.